

REMARKS

In the Office Action, claims 27-34 and 38-45 were rejected under 35 U.S.C. § 102(b) as being anticipated by USP 5,784,289 issued to Wang (Wang). Claims 27 and 38 were also rejected under 35 U.S.C. § 102(b) as being anticipated by USP 6,058,254 issued to Scepanovic et al. (Scepanovic). In this Amendment, Applicants have amended claim 38, and added claims 47-52. Accordingly, claims 27-52 will be pending after entry of this Amendment.

I. Wang

Claims 27-34 and 38-45 stand rejected under § 102(b) as being anticipated by Wang. Applicants respectfully traverse this rejection.

10 A. Claims 27-34

Each of the claims 27-34 recites a method of routing several nets in a region of an integrated circuit ("IC") layout, where each net has a set of pins in the region. This method:

- (a) partitions the region into several sub-regions, where several edges exist between the sub-regions,
- 15 (b) for each particular net, identifies an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge, where a potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins; and
- 20 (c) uses the identified edge-intersect probabilities to identify routes for the nets.

For several reasons, Applicants respectfully submit that Wang does not disclose or teach such a method. First, Wang does not disclose or teach a method that for each net identifies for each edge an edge-intersect probability, which specifies the *probability that a set of potential routes for the net will intersect the edge*. Instead, Wang discloses a method that computes a net

density value that is equal to the capacity of the edge divided by the capacity of the edge plus the capacities of all edges that are collinear with the edge within the bounding box of the net. *See*, e.g., column 6, lines 42-53 and column 7, lines 59-65.

Second, Wang does not disclose or teach a method that uses the identified edge-intersect probabilities *to identify routes for the nets*. This is because Wang does not disclose a router. Rather, Wang discloses a method of estimating routability and congestion in cell placement. *See* Title, Figure 2, column 4, lines 24-27. Accordingly, *Wang does not disclose or teach how to use edge-intersect probabilities in identifying routes* for nets in a region of an IC layout.

In view of the foregoing remarks, Applicants respectfully submit that Wang does not anticipate claims 27-34. Accordingly, Applicants request reconsideration and withdrawal of the § 102(b) rejection of claims 27-34 based on Wang.

B. Claims 38-45

Each of the claims 38-45 recites a method of routing several nets in a region of an integrated circuit ("IC") layout. This method:

- 15 (a) partitions the region into several sub-regions, where several paths exist between said sub-regions,
- (b) for each particular net, identifies a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path, where a potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins; and
- 20 (c) uses the identified path-use probabilities to identify routes for the nets.

For same reasons as stated above for claims 27-34, Applicants respectfully submit that Wang does not disclose or teach such a method. Specifically, Wang does not disclose or teach a method that for each net identifies for each path a path-use probability, which specifies the

probability that a set of potential routes for the net will use the path. Instead, Wang discloses a method that computes a net density value that is equal to the capacity of an edge divided by the capacity of the edge plus the capacities of all edges that are collinear with the edge within the bounding box of the net. *See, e.g.,* column 6, lines 42-53 and column 7, lines 59-65.

5 Also, Wang does not disclose or teach a method that uses the identified path-use probabilities *to identify routes for the nets.* This is because Wang does not disclose a router. Rather, Wang discloses a method of estimating routability and congestion in cell placement. *See Title, Figure 2, column 4, lines 24-27.* Accordingly, *Wang does not disclose or teach how to use path-use probabilities in identifying routes* for nets in a region of an IC layout.

10 In view of the foregoing remarks, Applicants respectfully submit that Wang does not anticipate claims 38-45. Accordingly, Applicants request reconsideration and withdrawal of the § 102(b) rejection of claims 38-45 based on Wang.

II. Scepanovic

Claims 27 and 38 stand rejected under § 102(b) as being anticipated by Scepanovic.

15 Applicants respectfully traverse this rejection.

A. Claim 27

As mentioned above, claim 27 recites a routing method that

- (a) partitions the region into several sub-regions, where several edges exist between the sub-regions,
- 20 (b) for each particular net, identifies an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge, where a potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins; and

(c) uses the identified edge-intersect probabilities to identify routes for the nets.

For several reasons, Applicants respectfully submit that Scepanovic does not disclose or teach such a method. First, Scepanovic does not disclose or teach a method that for each net identifies for each edge an edge-intersect probability, which specifies the *probability that a set of potential routes for the net will intersect the edge*. Instead, Scepanovic discloses heuristic techniques that estimate the density values that it assigns to horizontal or vertical edges in a partitioning grid. *See, e.g., column 5, line 25 to column 6, line 62.* None of the values computed by these heuristic techniques quantifies a probability that *a set of potential routes for a net will intersect the edge*.

10 Second, Scepanovic does not disclose or teach a method that uses the identified edge-intersect probabilities *to identify routes for the nets*. This is because Scepanovic does not disclose a router. Rather, Scepanovic discloses a method for optimizing a placement by moving cells to reduce potential congestion. *See Abstract, Figure 2, column 3, line 15 to column 4, line 37.* Accordingly, *Scepanovic does not disclose or teach how to use edge-intersect probabilities in*
15 *identifying routes* for nets in a region of an IC layout.

In view of the foregoing remarks, Applicants respectfully submit that Scepanovic does not anticipate claim 27. Accordingly, Applicants request reconsideration and withdrawal of the § 102(b) rejection of claim 27 based on Scepanovic.

B.Claim 34

20 As mentioned above, claim 34 recites a routing method that

- (a) partitions the region into several sub-regions, where several paths exist between said sub-regions,
- (b) for each particular net, identifies a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will

use the particular path, where a potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins; and

(c) uses the identified path-use probabilities to identify routes for the nets.

For several reasons, Applicants respectfully submit that Scepanovic does not disclose or teach such a method. First, Scepanovic does not disclose or teach a method that for each net identifies for each path a path-use probability, which specifies the *probability that a set of potential routes for the net will use the path*. Instead, Scepanovic discloses heuristic techniques that estimate the density values that it assigns to horizontal or vertical edges in a partitioning grid. *See, e.g.*, column 5, line 25 to column 6, line 62. None of the values computed by these heuristic techniques quantifies a probability that *a set of potential routes for a net will use the path*.

Second, Scepanovic does not disclose or teach a method that uses the identified path-use probabilities *to identify routes for the nets*. As mentioned above, Scepanovic does not disclose a router, but rather discloses a method for optimizing a placement by moving cells to reduce potential congestion. *See Abstract, Figure 2, column 3, line 15 to column 4, line 37. Accordingly, Scepanovic does not disclose or teach how to use path-use probabilities in identifying routes for nets in a region of an IC layout.*

In view of the foregoing remarks, Applicants respectfully submit that Scepanovic does not anticipate claim 34. Accordingly, Applicants request reconsideration and withdrawal of the § 102(b) rejection of claim 34 based on Scepanovic.

CONCLUSION

In view of the foregoing, it is submitted that the claims are in condition for allowance.

Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

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Respectfully submitted,

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